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## 4-H Beef Club Manual : Extension Circular 2-61-2

Paul Q. Guyer

Don K. Wiles

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1956

E.C.2-61-2

# 4-H BEEF CLUB

## *Manual*



EXTENSION SERVICE  
UNIVERSITY OF NEBRASKA COLLEGE OF AGRICULTURE  
AND U.S. DEPARTMENT OF AGRICULTURE  
COOPERATING  
W.V. LAMBERT, DIRECTOR



This manual is designed to help older club members with feeding and management problems. Beginners and younger club members should use Extension Circular 2-60-2, "My First 4-H Beef Calf." No attempt has been made to discuss the principles of fitting and showing in this manual. Those who desire such information are referred to Extension Circular 0-23-2, "Fitting and Showing Meat Animals." It is available through the local county extension service office.

Boys and girls will gain experiences from the market beef project that will help them in later life. Some of these experiences are:

Associating with people. Such opportunities occur in 4-H Club meetings; at fairs, shows, contests, and at other 4-H activities; and when calves are bought and sold.

Competing with others. The chance for good clean competition is one of the greatest enjoyments club members will have.

Feeding calves. Becoming skilled in the art of cattle feeding is an important part of this project. Club members will learn to feed calves so that they will economically convert farm forage and grains into beef.

Managing cattle. Becoming skilled in the art of cattle management (herdsmanship) is an important phase in beef production. Club members will also have an opportunity to learn how to present their product in the most desirable manner.

Selecting and judging livestock. The principles learned in the selection of a few animals will apply to larger numbers.

Controlling parasites and diseases. Knowledge of the causes, symptoms, and methods of preventing diseases, and control of parasites is essential for profitable beef production.

Learning matters of finance. The club member will purchase the calf, feed, and equipment; market the calf; and carefully record all of the expenses and income in his project record book. While it is hoped that the member realizes a financial profit, do not forget that the educational benefits of this project are equally important.

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The following University of Nebraska College of Agriculture staff members helped write various parts of this manual: E. A. Olson, K. C. Fouts, Eldon L. Erickson, Oliver D. Grace, and Robert E. Roselle. The cooperation of many other members of the College is also acknowledged.



# 4 H Beef Club Manual

Paul Q. Guyer and Don K. Wiles

## Requirements

You are enrolling in one of Nebraska's most popular 4-H projects. Beef production is Nebraska's leading livestock enterprise. Nearly 40 percent of Nebraska's gross farm income comes from the production of about 1 1/2 billion pounds of beef. Feeding cattle is an excellent way to convert pasture, hay and other roughage, and grain into human food. As a beef club member you may be taking your first step in a life time career as a cattle feeder.

### PROJECT

To help you obtain the greatest benefit from this project, minimum requirements have been set up as follows:

1. Feed one or more calves.
2. Maintain records on the project for at least four months.

A standard 4-H record book may be obtained through your local county agent; and both your county agent and your local club leader will be glad to help you.

Most shows in Nebraska require that calves be owned by the member at least five months preceding the opening date of the show. For proof of ownership the calf is usually tagged and recorded by your county agent or local club leader. Tagging should be done at the beginning of the project year.

If you are to gain the most from your project, you must have the fullest cooperation of your parents and local club leader. You are responsible for your project, and you will be expected to take care of it. Your parents and leader should help, guide, counsel, and encourage you.

### SUCCESSFUL FEEDING PROGRAM

You will need to meet four requirements, if the market beef project is to be a success. They are:

1. Feed a healthy calf that is capable of making rapid gains.
2. Allow enough time for necessary gain.
3. Apply proper management practices (good herdsmanship).
4. Feed an adequate ration.

The following chapters will discuss the requirements of a successful feeding program.

## Selecting the Feeder

In order to select desirable feeders, you must understand the meaning of some commonly used words and terms. Following are some of the terms used by cattlemen. Others will be defined throughout this circular.

Balance: Proportionate parts; symmetry.

Blocky: Deep, thick, and low-set body conformation.

Carcass: The dressed body of an animal slaughtered for food.

Coarse: Lacking refinement or quality.

Condition, covering, and finish: The amount of fat on the animal.

Conformation: The animal's form or outline.

Fill: Feed and water contained in the stomach and intestines.

Flash: Stylish.

Leggy: Legs too long, upstanding.

Natural fleshing: Amount of muscling.

Open shoulders: Shoulder blades not smoothly laid in; usually with a depression on top.

Patchy: Very uneven covering of fat.

Paunchy: Too much middle.

Quality: Refinement of hair, hide, and bone.

Rangy: Too long and/or too tall.

Rugged: Strong, sturdy, or hardy conformation, but not necessarily coarse.

Scale: Size

Scurs: Small growths of horny tissue on heads of polled animals.

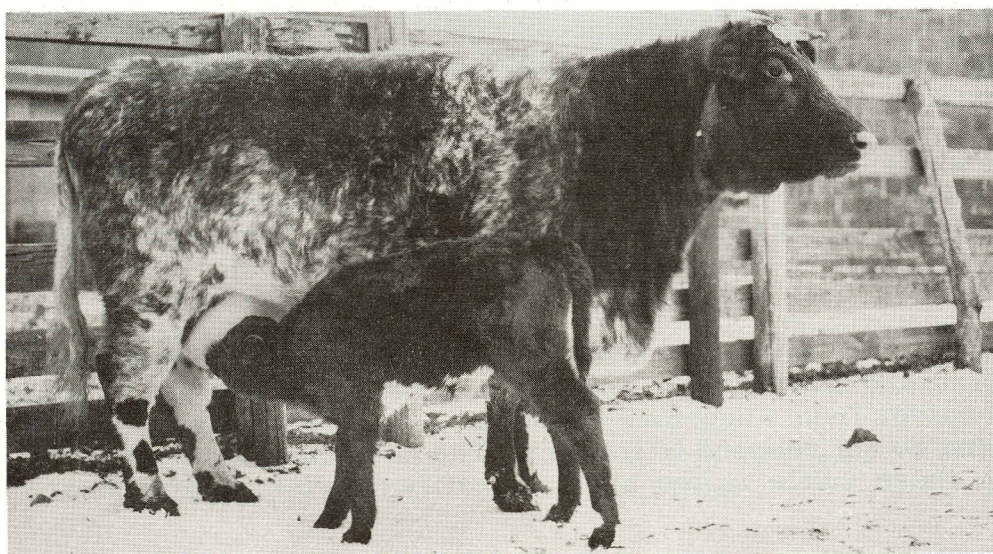
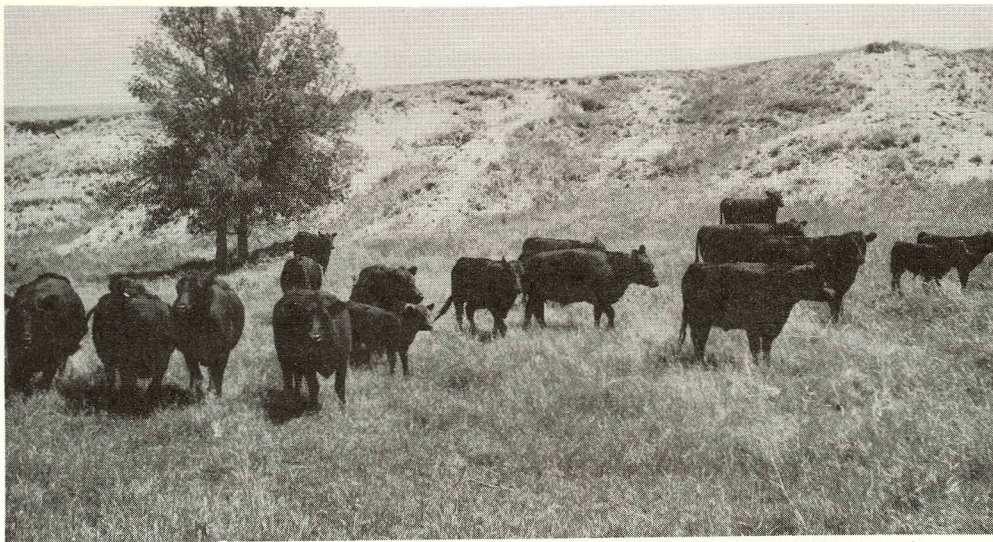
Shank: The part of the leg directly below the knee or hock in the live meat animal. In the carcass it is that part of the leg directly above these joints.

Style: Pleasing appearance due to attractive conformation, carriage of body, and grace of movement.

Tie: A depression on the back where the skin is attached to the backbone. It becomes deeper as condition increases.

Type: The conformation that makes an animal valuable for a specific use.





Feeders may be bought from cattle ranching areas such as the Nebraska Sandhills (above), a salebarn or livestock marketing center (center) and one's own herd or the neighbor's herd (below). Picture of salesring -- courtesy of Omaha Livestock Marketing Center.



## WHEN AND WHERE TO BUY

The best time to buy is when the price is at the seasonal low. This usually occurs during the fall and early winter months.

Prospective feeder cattle can be purchased at many places; such as from the home or neighboring herd, livestock marketing centers, and cattle breeding areas away from home. If you know the factors to consider when selecting the calf and if the seller is reliable, your purchase should be satisfactory. Do not be afraid to request the aid of a competent adult. He will be glad to help.

You may feed out calves raised on your own farm; and some of you may use calves from a neighbor's beef herd. The choice may be limited, but many good feeders come from small herds. One advantage of such purchases is that the calves do not have to be moved far.

You may prefer to go directly to the range area to buy calves. There you can see the breeding herd, and get some idea of the beef type and quality of the calf's ancestors. Many ranchers are reluctant to "top-out" 4-H club calves, because other buyers hesitate to buy cattle that have been topped. The excitement of rounding up and sorting causes heavy shrinkage, not to mention the time and labor involved. Consequently, it is usually better for a number of 4-H club members to pool their requirements and to buy in relatively large groups.

You may feel that you can not afford to spend the time and money required to buy directly from a ranch, and would rather buy from a local marketing firm or stockyard. The price per pound is in many cases higher at the local market, because transportation and handling costs are included in the selling price. Such buying may be the most satisfactory, providing the quality of cattle is suitable.

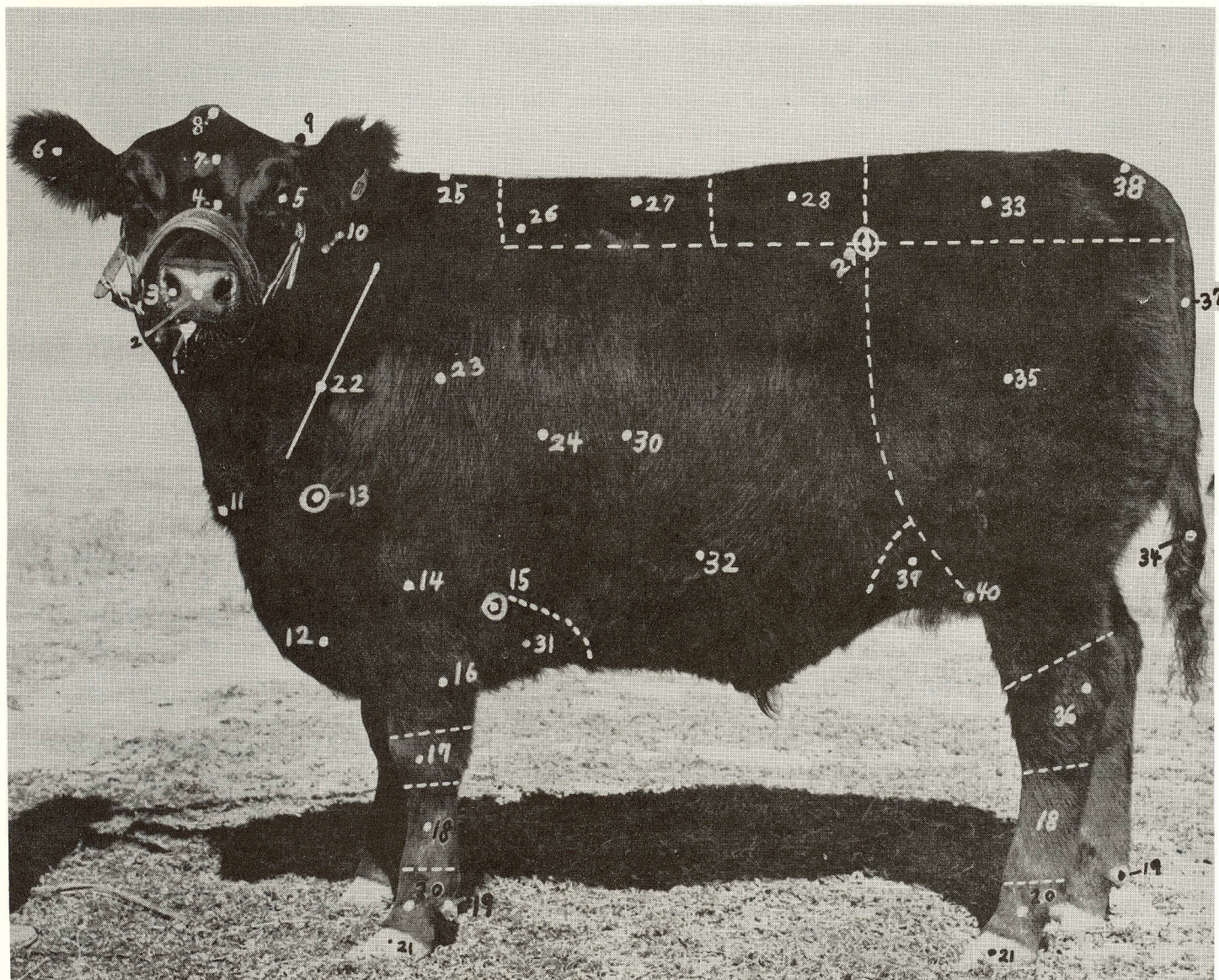
## POINTS TO CONSIDER

When selecting project animals, keep in mind what the finished animal should look like. You must consider conformation, quality, and the ability to make fast gains. Calves of certain lines or families within a breed have often proved to be superior to the majority of the calves of the same breed. Such calves are the result of generations of good breeding, and are much sought after by top cattle feeders. The conformation of the prospective feeder calf is of primary importance, but any additional information on proven ancestors is helpful.

Note the health of your prospective feeder. Select feeder calves that are thrifty in appearance and alert; and that have a glossy coat. The disposition of the animal is also important. Avoid calves from abnormally wild herds. They are usually too restless to eat and gain well, and do not respond to training. The possibility of injury to you and your friends in handling these cattle is too great to justify the risk, and gains are slow and costly.

The price of the prospective feeder calf should be considered. The current market price will help determine how much you will need to pay. You should be able to buy desirable calves at about the terminal market price.





### PARTS OF THE STEER

- |             |                       |                     |                |
|-------------|-----------------------|---------------------|----------------|
| 1. Mouth    | 11. Dewlap            | 21. Hoof            | 31. Foreflank  |
| 2. Muzzle   | 12. Brisket           | 22. Shoulder Vein   | 32. Paunch     |
| 3. Nostril  | 13. Point of Shoulder | 23. Shoulder        | 33. Rump       |
| 4. Face     | 14. Arm               | 24. Forerib         | 34. Switch     |
| 5. Eye      | 15. Elbow             | 25. Top of Shoulder | 35. Thigh      |
| 6. Ear      | 16. Forearm           | 26. Crops           | 36. Hock       |
| 7. Forehead | 17. Knee              | 27. Back            | 37. Tail       |
| 8. Poll     | 18. Shank             | 28. Loin            | 38. Tail Head  |
| 9. Crest    | 19. Dewclaw           | 29. Hip or Hooks    | 39. Hind Flank |
| 10. Neck    | 20. Pastern           | 30. Ribs            | 40. Cod        |



Conformation. A fancy feeder is deep, thick, and low to the ground. The topline will be straight; and the underline nearly parallel to it. The calf should have balance; that is, each part of the body should be in proportion to the other parts. The legs and feet should be located under each quarter of the calf's body with the toes pointing directly forward. Be sure the feeder has enough size for his age--abnormally small calves should be avoided.

Select thick calves with straight parallel side lines along the top of the shoulder, back, loin, and rump. You can see this by looking down the animal's back. The ribs should round out well from the backbone. Calves with ribs that do not round out but that slope rather straight, are called "slab sided" and should be avoided. A desirable feeder calf must have a roomy middle in order to consume large amounts of feed.

Note the muscling of the calf. Deep thick thighs, wide thick forearms, and low full flanks are desired. Quarters that carry down well to the hock and are deep in the twist show that the animal is heavily muscled. Low, full rear flanks are usually found with the thigh or round that carries down well.

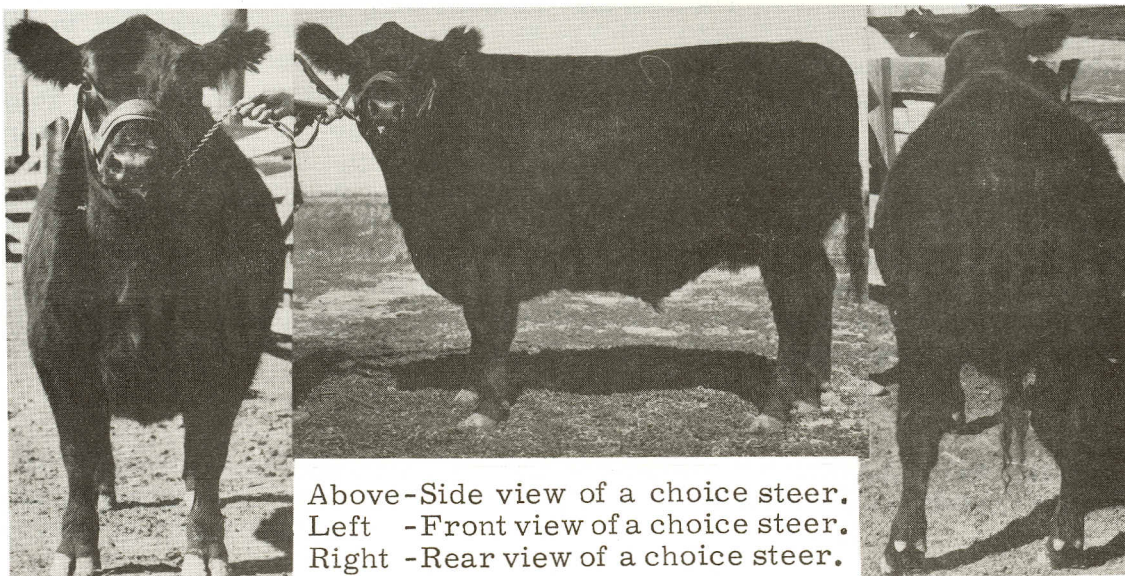
The loin should be wide and thick, because it is the highest priced cut in the carcass. It should blend smoothly with the rest of the calf.

The rump should be long and full. The distance from the hip to the pinbones indicates the length. This distance should be as long as or longer than the distance from the back of the shoulder to the hip bone. The pinbones should be slightly lower than the hip and wide apart. The top of the tail setting should be level with the rest of the calf's top line.

The good head is wide between the eyes, broad at the muzzle, and deep through the jaw. A large open nostril, a large eye that is quiet but alert, and a general impression of being clean cut or trim about the head are desirable features. An alert carriage of the head, free from wildness, adds much to the animal's style.

The neck should be short, thick, and free from excessive skin about the throat and dewlap. It should blend smoothly into the shoulder.

The forequarters should be wide, but not coarse; and blend well with the rest of the body. Avoid feeders with open shoulders. Look for a brisket that is smooth, neat, and trim. Prominent, low briskets should be avoided. A low brisket is an obstacle to balance, and on the fat animal contains much waste fat.



Above-Side view of a choice steer.  
Left -Front view of a choice steer.  
Right -Rear view of a choice steer.



## JUDGING GUIDE FOR FEEDER STEERS AND HEIFERS

## GENERAL APPEARANCE

Weight in pounds according to age (approximately)		
Age	Steers	Heifers
5 months	370	345
6 "	410	385
7 "	440	415
8 "	460	435

Form -- straight topline and underline, wide, deep, short from knee to ground, balanced, stylish, roomy middle, smoothly turned, heavily muscled.

Quality -- hair soft and mossy, hide pliable, bone and head moderately refined, free from enlarged joints.

Condition -- uniform finish.

## HEAD AND NECK

Muzzle -- broad, large nostrils.

Eyes -- large, clear, quiet expression.

Face -- moderately short, clean cut.

Forehead -- broad.

Ears -- medium size, fine texture.

Neck -- short, thick, blends smoothly into shoulder vein, has clean throat.

## FOREQUARTERS

Shoulder Vein -- full, smooth.

Shoulder -- wide, smooth on top, shoulder points smoothly laid in.

Brisket -- neat and trim.

Legs -- straight, wide apart, short below knee, full forearm, toes point directly forward.

## BODY

Chest -- deep, wide.

Back -- broad, level, full crops.

Ribs -- well arched, long.

Loin -- wide, thick.

Flank -- full, nearly even with underline.

## HINDQUARTERS

Hooks -- well laid in, not prominent.

Rump -- long, wide, smooth at tail head.

Thighs -- deep, wide, thick.

Twist -- deep.

Legs -- well placed, short below hock.

## HEALTH

Thrifty appearance, alert, glossy hair.

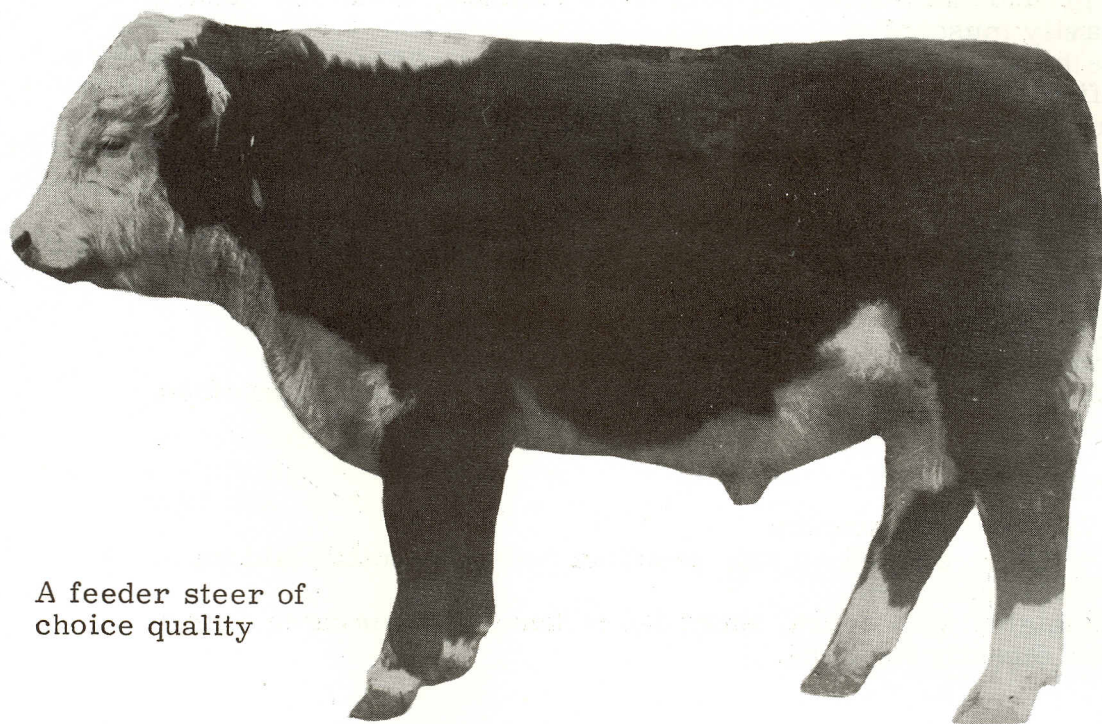
## DISPOSITION

Free from excessive wildness, alert, and active.

**Quality.** Calves of desirable quality will have moderately refined bones, a loose pliable skin, and a soft mossy hair coat. Individuals that have noticeably large joints and heads and thick skin seldom develop into high quality market beefs.

**Condition.** Feeder cattle and calves vary a great deal in the amount of fat they carry. Thin, healthy cattle usually gain more rapidly than feeders in higher condition. More time must be allowed for thin feeders to reach the desired market condition than for fat ones.

Uniformity of finish should be considered and is a desirable characteristic. The best way to determine uniformity of fat covering is to feel, with the flat hand or fingers, over the ribs, shoulder, and loin.



A feeder steer of choice quality

## Care and Management

### PLANNING

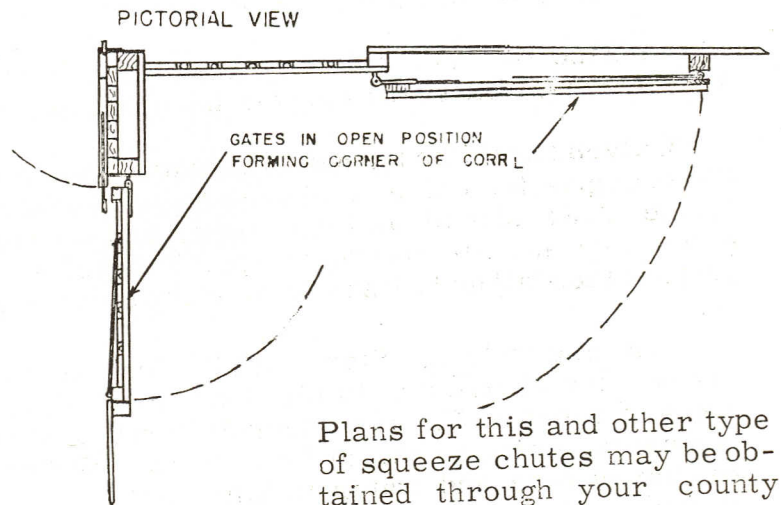
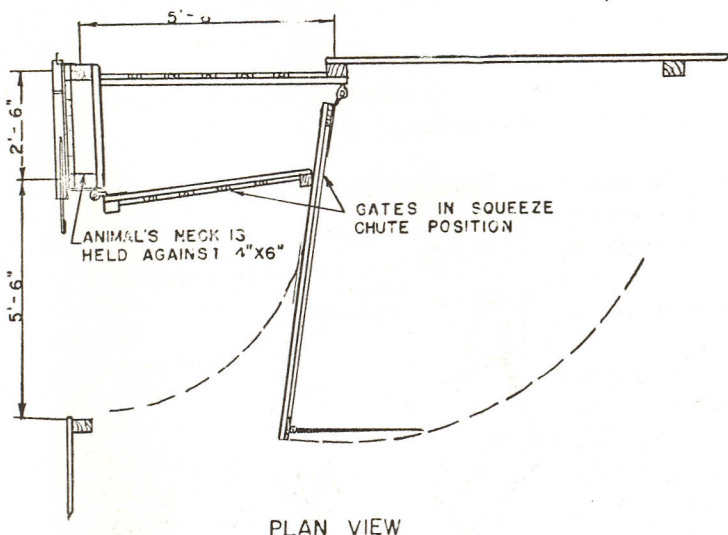
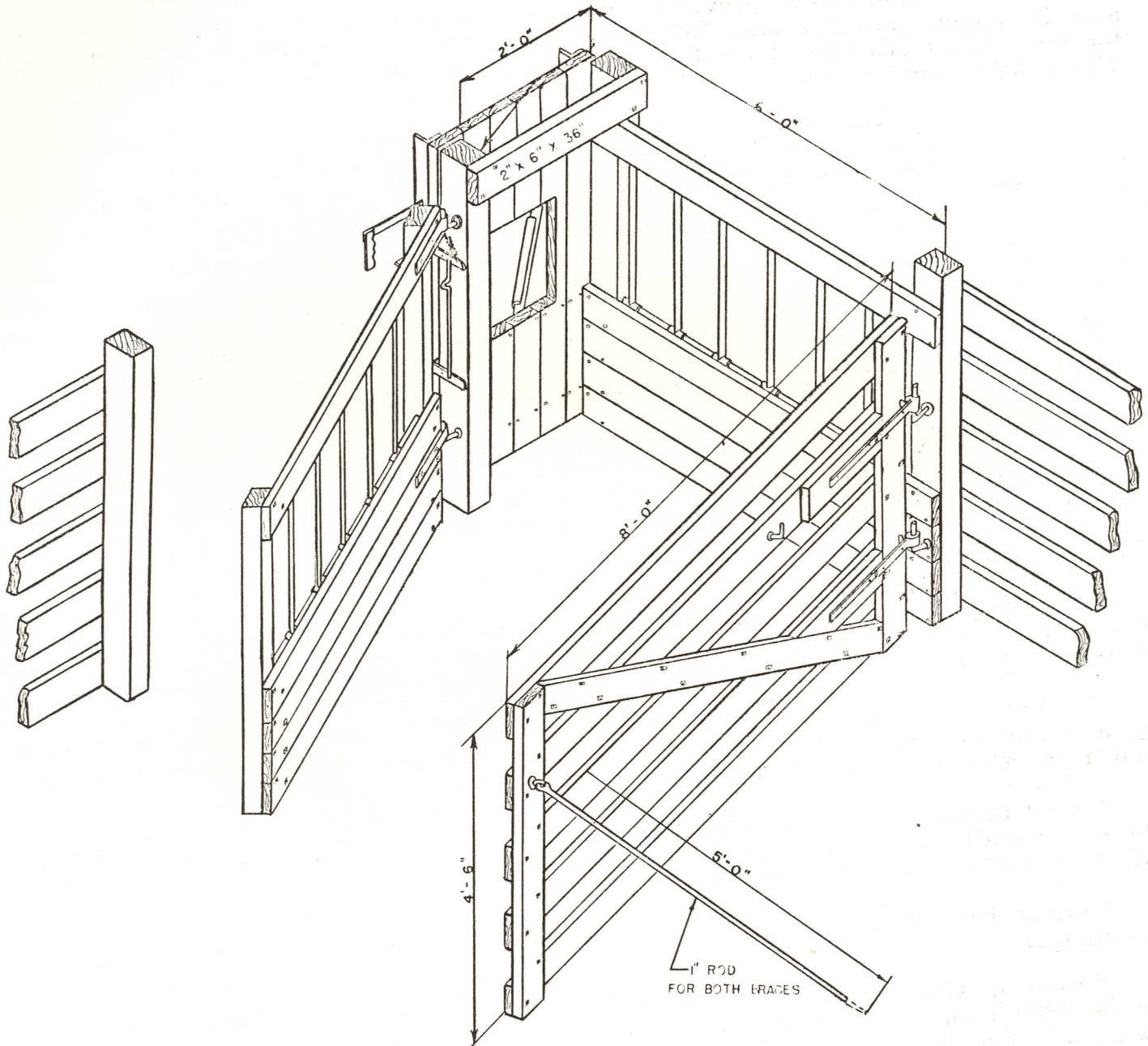
Feeding cattle is much like building a house -- good results are achieved only after careful planning. How to feed and care for the calf, how to finance the project, and how to market the calf should all be planned at the beginning of the project year.

Two or more calves fed together will ordinarily do better than when one is fed alone. If only one calf is to be fed for the project, and other members of the family do not have 4-H calves, it may be wise to feed another calf of some type along with the project animal.

### TIME REQUIRED

Many otherwise good cattle turn out to be disappointments because too little time is allowed for growth and fattening. The experienced commercial feeder has learned that the feeder steer calf ordinarily must double his weight before he is as good a fat steer as he was a feeder calf. In other words, a choice feeder steer weighing 480 pounds when purchased must weight about 960 pounds to be sold as a choice fat steer. Heavier calves may require less gain, and lighter steers may require more gain in relation to beginning weights.





Plans for this and other type of squeeze chutes may be obtained through your county agent's office.

Feeder calves full-fed a good grain ration will gain about 2 pounds per day during a long feed. The choice steer, previously mentioned, needed 480 pounds gain to grade choice as a fat steer. For this about 240 days or eight months of feeding are required. But to top the market and most fat calf shows, the steer must be fat enough to grade prime. This usually requires another 60 days of careful feeding.



If you plan to show your calf, start it on feed at least 10 months before showing. Beginners and those that have not had project animals fat enough to win in a show in the past should start calves on feed about 11 months before the show date.

Heifer calves usually gain less rapidly, but fatten more quickly than steers. They require less time in the feed lot to reach the desired finish. A heifer, full-fed a balanced fattening ration for eight or nine months, should be fat enough to grade prime.

When high roughage rations are fed, additional time is required to produce satisfactory market cattle. If wintered on roughage and grazed for 60 days in the spring, approximately 12 months will be required to produce choice fat yearlings from choice calves.

## EARLY CARE

Handling. A good herdsman soon learns that cattle respond to proper treatment; and that a badly treated calf will react accordingly. This is especially true during the early phases of the feeding period when calves first become closely associated with people.

When handling cattle you should follow two rules: First, never frighten them; second, never make them angry. Some calves do not recover satisfactorily from either experience; and training is much more difficult once either mistake is made.

A good herdsman handles cattle gently so that they do not fear him. Upon arrival at the pen or stall make your presence known by using a firm voice. Avoid alarming tones. Allow the calf to respond to your voice before he is touched.

Nothing that seriously disturbs a calf should be done in his stall. His stall should be his refuge.

Trucking. Care should be used in trucking calves to their new homes. If one calf is transported alone, tie the calf so that he can lie down. Transporting the calf with other cattle will give him a feeling of security.

In case of bad weather, cover the front third of the top and sides of the stock rack with canvas. This will prevent needless exposure to bad weather.

Calves should be loaded quietly and should not be excited. Use loading equipment that does not give the calves a chance to break away. The sides of the chute should be high, tight, and strong enough to discourage any attempts to escape. The walls, fences, and gates of the stall and lot should meet the same requirements.

Training to lead. Start training the calf as soon as he has become accustomed to his new home and does not show signs of illness. Tie him securely (preferably with a knot that can be untied quickly and easily) for the first few days, and carry feed and water to him. Allow about 18 inches of lead and tie about 18 inches above the ground. This





will permit the calf to lie down, but will give him little chance of becoming entangled. If he is nervous, tying another animal with him will help him to quiet down. For the first time, tie the calves for only a few hours; preferably when you can be around to observe how they get along. After that they should be kept tied. At the end of about two days they should be ready to handle.

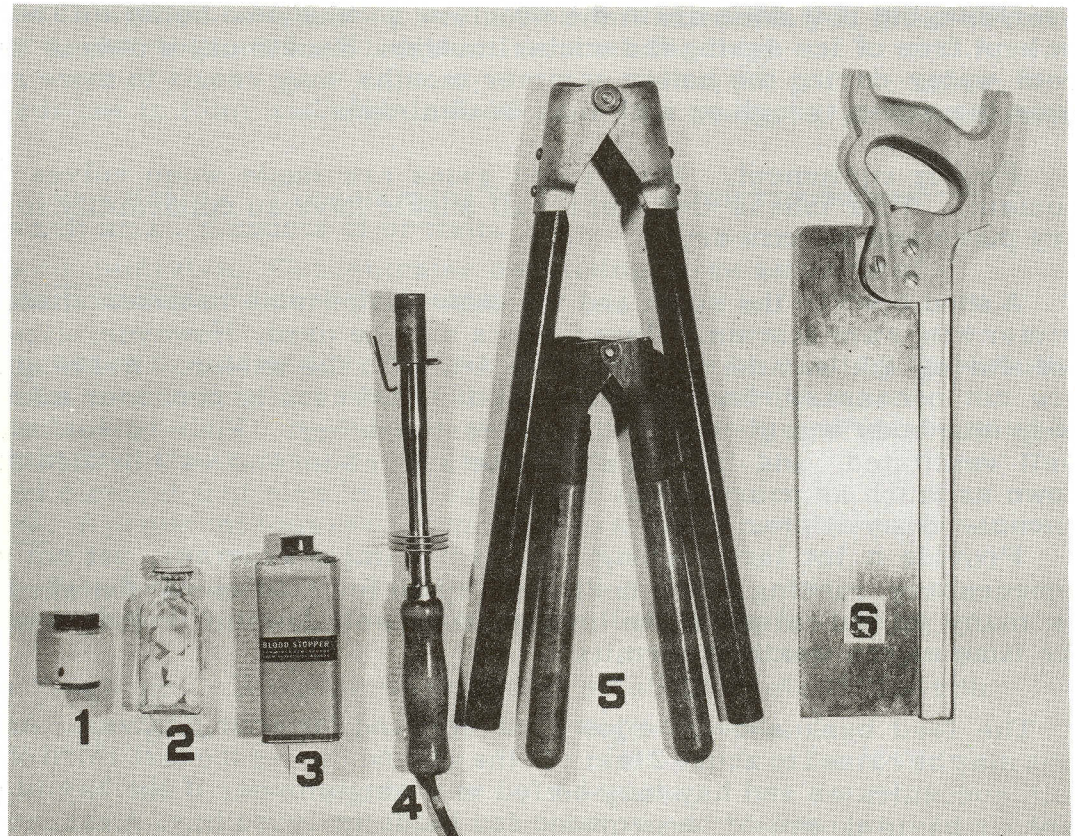
A calf likes to be brushed, and regular brushing will help to quiet him. After he has become accustomed to handling, lead him. Once he has learned to lead he will never forget. Leading to water is an excellent way to start. Care should be taken to keep him from getting loose or becoming excited. If that should happen, the calf may become difficult to handle.

Use a stout rope halter with a lead long enough to be handled by two people. Have someone with plenty of strength and weight to help hold the calf. Use the lead only to restrain him at the beginning. When he quiets down, drive him toward some chosen destination, possibly a water tank or feed bunk. Then turn him loose. Do this regularly for a few days. He will soon learn what is expected and will begin to lead. Then lead him to new areas. If he lags, pull firmly and relax the lead alternately. Be calm and patient. Do not jerk or beat the calf. It will help to pull him to one side and then to the other. Use every opportunity to lead the calf in the presence of strangers.

Castration. Feeder calves should have been castrated before weaning. If the male calf has not been castrated before the project is started, it should be done soon; before much coarseness has developed. The aid of an experienced cattleman or veterinarian will be necessary in performing this operation.

In the show steer, a smooth, well balanced cod is desired. Scar tissues often cause a noticeable puckering of the skin as it fills with fat. To avoid this the incision should be made on the front side of the scrotum and extended well down to insure good drainage.

Horns can be prevented or removed by using one or more prescribed procedures. No. 1, commercial paste; No. 2, caustic sticks; No. 3, commercial blood stopper, which helps form a coating over a wound; No. 4, electrical dehorner, No. 5, mechanical dehorner (use the small one for dehorning calves about 5 months old and the large one for calves about 12 months old); and No. 6, dehorning saw.





Dehorning. Most club members and cattle feeders prefer dehorned or polled feeder calves. Dehorning should be done at a young age. If the calf is raised on the home farm, caustic may be used before the calf is 10 days old. Mechanical dehorner will do an excellent job on calves up to 12 months of age. Cut or burn deep to insure against stub horns.

## GENERAL MANAGEMENT

Proper management (being a good herdsman) is a vital part of any successful livestock enterprise. The old adage, "The eye of the master fattens his cattle" is as true today as it always has been. For best results you must provide:

1. Clean, fresh feed; and slow and cautious changes in the feeding program.
2. Clean, fresh water.
3. Proper equipment.
4. Care of feet and hair.

Feed management. Changes in the ration should be made gradually and with caution. Rapid changes usually result in the calves' going "off feed." Gains are lost when this occurs.

Feeding regularly is a characteristic of a good herdsman. Calves become restless when feeding time comes and no feed is in sight. The grain fed should be cleaned up in about an hour.

Feeding fresh feed in clean troughs or pans is a must. Providing fresh feed daily and grinding feed weekly, or at least every other week, will aid in maintaining the calf's appetite. All old feed left in the trough should be removed before fresh feed is placed before the calf. Feed left over from a previous feeding is not appetizing.

Water management. Clean, fresh water should be available at all times. The water tank or trough should be located close to the shed and feed bunks. Do not let the water overflow, but if it does drain the overflow so that mud holes will not form. Water should be kept free of ice during the winter months. Recent experiments indicate that providing cool water during the hotter summer months may result in more rapid gains. A shade over the water trough or tank may be desirable.

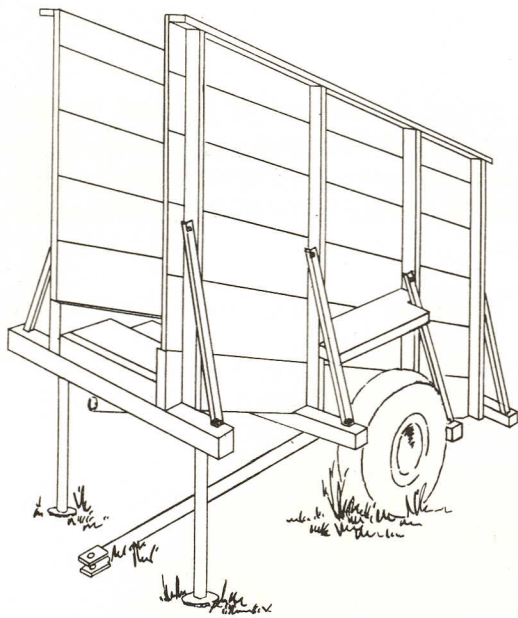
Proper equipment. Most rapid gains are made when calves are comfortable and content. This means that your calf should have an opportunity to eat and lie down in a dry place and remain dry.

A shed open to the south and the east will provide summer shade and protection from winter winds and storms. Closed sheds may be used. However, closed sheds are usually hot during the summer and may be drafty in the winter. Warm quarters for the winter are not necessary, because the well-fed calf usually produces more heat than needed to keep his body warm during the coldest weather. Your calves' stall should be roomy, well ventilated, and dry. It should be kept clean and well bedded so that calves will lie down as much as possible.

Provide a lot large enough to permit ample exercise, yet not so large as to permit unnecessary running. A lot 20 feet by 50 feet, adjoining the shed, is large enough for as many as ten calves. The lot should be well drained so that it will be dry as much of the time as the weather permits.

The feed bunk should be low to the ground for young calves. As the calf grows, the bunk may be raised to about 2 feet off the ground during the last third of the feeding period. Both concentrates and hay may be fed in a single bunk, if the hay is ground. A separate bunk or hayrack should be provided for baled or loose hay. A salt and mineral box should be located in a dry place within the shed.





Plans for different kinds of loading chutes may be obtained through your county agent's office. This portable airstair loading chute is described in plan no. 87341

Some members go to extra expense in providing relief from summer heat. Sun shades, cool drinking water, and sprinkling the calf help to keep him cool and to maintain gains during the hot summer months. Fans do not help cool a beef animal, unless his skin is wet or the temperature of the circulated air is lower than the temperature of the skin.

A chute with head squeeze can be used on many occasions; for example, for holding the calf for castration, vaccination, tattooing or ear tagging, and treatment of bloat and diseases.

Care of feet and hair. Little time needs to be spent caring for feet and hair during the feeding period, unless the calf is to be shown. Very little foot trouble will normally occur, if (1) the stalls, sheds, and lots are kept clean, dry and well drained and (2) the calves are given plenty of exercise. If the toes do grow too long and interfere with proper movement, they should be trimmed as outlined in Circular 0-23-2, "Fitting and Showing Meat Animals."

Brushing the hair helps to gentle the calf, and removes dead hair, dirt and oil. Regular brushing is the best care you can give the calf's hair.

Care of feet and hair is discussed in Circular 0-23-2, "Fitting and Showing Meat Animals."

## Feeding

Before you can know what it takes to properly feed cattle, you must understand some basic facts about animal nutrition. Following are definitions of terms you must become familiar with in order to gain a sound knowledge of livestock feeding.

Concentrates. Feeds low in fiber and high in food value; for example, grain and most protein supplements.

Carbonaceous concentrates. Concentrates containing large amounts of carbohydrates and small amounts of protein.

Proteinaceous concentrates. Concentrates containing large amounts of protein and small amounts of carbohydrates.

Digestion. The process of breaking down feeds so that they can be used by the animal.

Fiber. The part of a feed that is not readily digested by the animal.

Hormone. A chemical produced by cells in one part of the body and transported by the blood to another part of the body where it exerts an effect.

Nutrient. Any food element that aids in the support of life.

Protein supplement. A proteinaceous concentrate fed as a supplement to carbonaceous feeds.

Ration. The feed given to an animal over a 24-hour period.

Roughages. Feeds high in fiber and low in food value; for example, hay.

Carbonaceous roughages. Roughages containing small amounts of protein.

Proteinaceous roughages. Roughages relatively high in protein.

Rumen. The largest of the four compartments or stomachs.

Ruminant. An animal that chews the cud and has a compound stomach with four compartments. Cattle and sheep are ruminants.



## REQUIRED NUTRIENTS

No market beef project can be successful without feeding a ration that supplies enough nutrients for both growth and fattening. A number of rations are satisfactory. If you check the feeds fed to prize winning steers at major livestock shows, you will find that few have been exactly alike. Yet all the steers were well finished.

The nutrients needed by cattle and the primary use made of them in the animal body are listed in table 1.

Table 1. - Nutrients Needed by Animals

NUTRIENT	USE
1. Carbohydrates & Fats	Energy for body heat and movement; and fattening.
2. Protein	Formation of muscle and bone.
3. Vitamins	Maintenance of body tissues and processes.
4. Minerals	Formation of bone; formation and function of body tissues and fluids.
5. Water	Carry nutrients to and waste products from body cells; regulation of body temperature.

Carbohydrates and fats are converted to energy and used by the animal for body heat, movement of muscles, and the formation of fat.

Protein is used for muscle (red meat) and bone formation. It differs from carbohydrates and fats mainly because it contains nitrogen. Too little protein in the rations results in slow growth and improper muscle development. Young animals need a higher percentage of protein in their ration than older animals. The shortage of protein in livestock rations probably limits production more than the lack of any other nutrient.

Vitamins are used in many ways in the growing and fattening process. Some 15 to 20 vitamins are required; but if cattle have access to sunshine, only vitamin A must be furnished in the ration. All other vitamins are made within the rumen.

Vitamin A is necessary for maintenance and health of the skin, eye, intestinal lining, and other similar tissues. If the ration does not provide enough vitamin A, the result may be watering of the eyes, night blindness, and slow gains; and in severe cases convulsions and death.

Most green feeds contain a substance called carotene that is converted to vitamin A by the body. Dehydrated alfalfa, green leafy hay of the current year's crop, good quality silage, and growing pasture are usually good sources of carotene.



Minerals are needed for many important body functions; especially for the formation of bone and teeth. You should be sure the animals have sufficient mineral, but avoid feeding excessive amounts. Except for calcium, phosphorus, sodium, and chlorine, grain and good quality hay produced in Nebraska normally furnish enough minerals for growing and fattening cattle.

Calcium and phosphorus may be furnished cheaply by steamed bonemeal or dicalcium phosphate. Sodium and chlorine are the minerals contained in salt. Salt and steamed bonemeal or dicalcium phosphate (equal parts by weight) ordinarily furnish the minerals that may be deficient in Nebraska feeds. This mixture should be provided in a small box where it will stay dry and be available to the calf at all times.



Water is the basic material of all body fluids. Water carries digested food nutrients to - and waste products from - all parts of the body. It also lubricates the joints. Cool water helps to eliminate excess heat from the body during the summer. The appetite may be greater and the rate of gain higher, if cool water is furnished instead of water heated by the hot summer sun.

## FEED ADDITIVES

A growing number of substances are being added to natural feeds, and are commonly spoken of as feed additives. A brief discussion of a few of the more common feed additives follows.

Non-protein nitrogen. Simple nitrogen compounds, such as urea, can be utilized in small quantities by fattening cattle. Nitrogen contained in these compounds is converted into protein in the rumen. Unless feeds containing non-protein nitrogen can be purchased at a lower cost than feeds of similar protein equivalent, no advantage is obtained from feeding them.

Antibiotics. To date, January 1, 1956, the addition of antibiotics to rations for fattening cattle has produced variable results. In some cases, cattle fed rations containing antibiotics have gained faster; in others, cattle fed rations without added antibiotics have gained more rapidly. Though the use of antibiotics in cattle fattening rations is not suggested at this time, you should watch the results of future experiments. These results should be your guide in helping you decide whether to feed antibiotics.

Hormones. Hormones or hormone-like chemicals are being tested for fattening cattle. In 1954 the most promising of these substances, diethylstilbestrol, was approved by the Food and Drug Administration. The Administration permits its use in the ration of cattle weighing 600 pounds or over at the rate of not more than 10 milligrams per head each day. Stilbestrol pellet implants have also been approved. When stilbestrol is fed, or implanted as recommended, more rapid and economical gains usually occur. Ordinarily carcass quality is not improved.

Yeast and dried rumen products. Experiments have shown that these materials do not improve cattle rations that contain enough of the essential nutrients.

## A GOOD RATION

Proper feeding of a good ration is necessary for maximum feed consumption, rapid and economical gains, and a thick mellow covering of fat.

A good ration:

1. Is balanced.
2. Is palatable.
3. Has proper physical balance (bulk).
4. Is economical.

A balanced ration furnishes all the nutrients in the amounts necessary for the growing and fattening animal. As the calf grows, the amount of the various nutrients needed changes from day to day and month to month. Thus, the ration must be continuously changed in order to maintain a proper balance of nutrients throughout the feeding period. The young animal needs a higher percentage of protein in the ration than finished cattle. As the calf increases in weight he needs more total feed and a larger percentage of energy producing feeds.

The palatability (agreeable taste) of the ration is very important. Fattening cattle will not eat enough feed to gain rapidly, unless the ration is palatable. The ration may not be palatable if the nutrients are not properly balanced. A change of protein supplement or concentrate may result in a more palatable ration and increased feed consumption.



Table 2. Classification of common feedstuffs.\*

Carbohydrates and Fats		Protein		Minerals		Vitamin A or Carotene
Concentrate	Roughage	Concentrate	Roughage	Calcium	Phosphorus	
Grains	Non-legume hays	Oilseed meals	Legume hays	Roughages	Concentrates	Dehydrated alfalfa
Molasses	Straw	Animal-by-Products	Dehydrated alfalfa	Steamed bonemeal	Steamed bonemeal	Current year green hay
Beet pulp	Corncoobs	Commercial feeds with more than 20% crude protein	Green growing pasture	Dicalcium phosphate	Dicalcium phosphate	Pasture
Animal fats	Row crop & small grain silage		Grass, legume, & beet-top or -leaf silage	Ground lime stone		Vitamin A concentrates
Commercial feeds with less than 20% crude protein						

\* According to their desirability as sources of nutrients required by cattle.



Physical balance (bulkiness) of the ration is very important in cattle feeding. Bulk in cattle rations is provided largely by roughages. It is important for proper digestion of the feeds consumed. Experiments have shown that the most rapid gains occur when an average of 1 pound of roughage is fed for each 2 or 3 pound of concentrates. More roughage than the average may be fed at the beginning and less than average during the latter part of the feeding period. Too much roughage will cause slow gains and wasty middles; too little roughage often results in poor appetite, digestive disturbances, and slow gains.

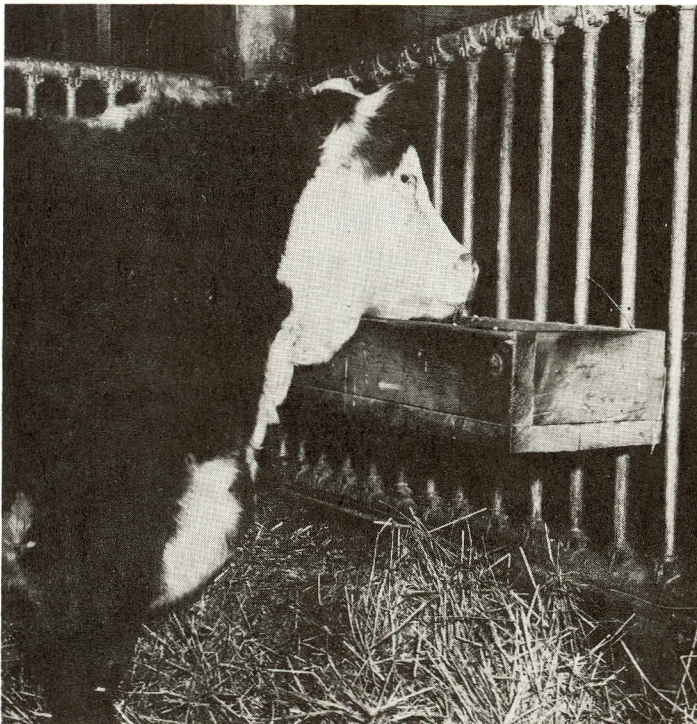
Economical feeding is a must for the commercial cattle feeder. Beef gains can be produced economically by feeding a maximum of homegrown feeds and a minimum of feeds produced off the farm. Purchased feeds that supply nutrients deficient in the home-grown feeds should be selected.

## FEEDS AVAILABLE

Our common feeds are grouped according to their desirability as sources of the various nutrients. (See table 2.) Home-grown feeds, except alfalfa hay, usually contain less protein than is needed by the fattening calf. These must be supplemented with proteinaceous concentrates or roughages in order to obtain satisfactory gains. Too little protein results in limited growth of bone and muscle, and consequently a less desirable finished product.

### Carbonaceous Concentrates:

Corn, the most common carbonaceous concentrate, is used as the standard to which other grains are compared. Properly supplemented, it puts on rapid and efficient gains. Older cattle gain faster when corn is coarsely ground; grinding the corn is not particularly beneficial for calves. Finely ground or hammered corn may not be as palatable as coarsely ground corn. Ground ear corn may be fed. However, the cob should be considered a



Feed-bunk is too high. It should be lower.



Feed-bunk of proper height. A bunk should never be over 2 feet in height for one-year old or older animals. They may be lower.



partial substitute for hay. Cracked or hammered corn has a tendency to become stale and unpalatable during hot weather. It tends to heat easily and if high in moisture, souring may occur. A fresh supply should be ground each week or 10 days; especially during hot weather.

Oats are not as valuable per pound as corn because of the hull. When oats form one-third or less of the concentrate mixture, they may be nearly equal to corn because of their higher protein content. Grinding the oats is not beneficial for fattening calves under one year of age; after that, medium fine grinding or rolling does improve their value. Oats are especially desirable for starting calves on feed, and for maintaining desirable condition near the end of the feeding period.

In some areas of Nebraska, barley is available for fattening cattle. Ground, rolled, or cooked barley will produce as rapid gains as shelled corn. Cattle may tire of barley during long fattening periods. They may bloat when barley is the only concentrate fed. Many professional feeders say that barley contributes to smoothness of finish. For that reason, barley is considered a good feed to use during the finishing period. For best results not more than half of the concentrates fed should be barley.

When the price justifies, wheat is a good substitute for as much as half of the corn in fattening rations. Wheat, fed alone, is not as palatable as other grains and tends to cause cattle to bloat, go "off feed," or both. Ground wheat becomes gummy when mixed with saliva and rumen fluids, and is therefore not desirable. A mixture of equal parts of ground wheat and corn is as desirable as corn alone.

Grain sorghums are well liked by fattening cattle. Cattle fed grain sorghums gain nearly as rapidly as those fed corn. Ground grain sorghums are worth about 95 per cent as much as corn. The different kinds of sorghum are more or less equal in feed value for beef cattle, but may vary in palatability. Sorghums that are not ground have a lower value than corn because the kernels are harder to digest.

Rye has given fairly good results when fed to fattening cattle. Usually, it should be mixed with other grains such as corn, oats, or barley. Like other small grains, it should be ground coarsely or rolled. Rye that is contaminated with ergot (a black, sooty substance) is not liked by livestock. Too much rye with ergot in the ration may cause digestive troubles.

Dried beet pulp is an economical substitute for up to half the grain ration, if it is cheaper per pound than corn. Part of the value of dried beet pulp seems to be due to its bulk, which aids in the prevention of bloat and digestive disturbances. Dried molasses-beet pulp does not differ markedly from dried beet pulp in feeding value; and it may be used in the same manner.

Molasses should be considered a substitute for corn. One pound of molasses is equal to about 0.7 pound of corn. Adding molasses to fattening rations containing good quality roughage is not advantageous, unless the cost of molasses is less than 70 per cent the cost of corn. Small amounts of molasses may be valuable when calves do not eat well or go "off feed."

Wheat bran adds bulk and palatability to the ration and is mildly laxative. It is often used to start calves on feed and is useful toward the end of the feeding period for maintaining (holding) fat calves until show time. Bran and oats are often used as substitutes for each other.

Animal fats, when included in well balanced fattening rations, may reduce the cost of gains; but their use normally does not result in increased rate of gain. Fat is also valuable for cutting down dust in ground feed. A pound of fat is equivalent to 2 1/4 to 2 1/2 pounds of grain. Not more than 1 pound of fat should be fed per head daily.



Commercial and mill feeds containing less than 20 per cent protein should be considered, for the most part, as replacements for grain in the ration. Those containing 16 to 20 per cent protein do reduce the need for protein supplements when used in substantial amounts but usually are expensive sources of protein.

#### Proteinaceous Concentrates:

Soybean oil meal, cottonseed meal, and linseed meal are excellent sources of protein for fattening cattle. The cost per unit of protein will determine which one is the most economical.

Soybean oil meal is one of the best protein supplements for beef cattle. It has a slightly laxative effect, but does not cause scours unless fed in amounts much larger than needed to balance the ration.

Cottonseed meal or cake of similar protein content is usually equal to soybean oil meal. Cottonseed meal contains more phosphorus than soybean meal, and may give superior results if a phosphorus supplement is not fed with the soybean oil meal. It also differs from soybean oil meal in that it is slightly constipating rather than laxative when fed in excessive amounts.

Linseed meal has long been noted for the "bloom" it produces on fattening cattle. Because of its lower protein content, more linseed meal than cottonseed or soybean oil meal must be fed to furnish the protein needs.

Animal proteins such as tankage, meat scraps, and fish meal may be used. They are not as well liked by cattle, and are usually more expensive than the plant proteins listed above.

Milk and milk by-products are excellent protein sources for fattening cattle. These feeds are usually expensive and result in costly gains. Milk-fed calves may finish more uniformly and show more bloom than those not fed milk.

Commercial feeds containing more than 20 per cent protein can be used as substitutes for the above feeds on a protein equivalent basis. For example, 2 pounds of a 20 per cent supplement are equal to 1 pound of a 40 per cent protein supplement so far as protein is concerned. Usually the higher the protein content the cheaper the cost per pound of protein.

#### Carbonaceous Roughages:

All grasses including the small grains, sorghums, and corn plants, may be used as carbonaceous roughage. Their value will depend on the stage of growth when the forage is harvested, the method of preservation, and the kind or species of grass.

These feeds vary in feeding value from season to season and year to year. However, the stage of maturity when each is harvested probably has more influence on its feeding value than any other factor. Early-cut hays are higher in protein, finer in texture, and more palatable to livestock than late-cut hays. Young growing grasses (pasture) are high in protein and should be classed as proteinaceous roughages. Roughages harvested with a minimum of exposure to weather are more nutritious than roughages that are rained on or sun-cured too long.

Small grains, corn, and sorghums are, in most cases, more valuable in the form of silage than fodder or hay.

Prairie and brome grass hays are the most common carbonaceous hays in Nebraska. Prairie hay is considered by many experienced herdsmen to be the best roughage for fitting cattle. Rarely can any digestive disturbance be attributed to it. After animals have been "off feed" prairie hay is one of the first feeds they will eat. Bromegrass hay is normally higher in protein than good quality prairie hay, if cut early and properly preserved.



Small grain hay and sorghum fodder may be used in fattening rations, but should be cut fairly early if best results are to be obtained. Careful storage is necessary to maintain the feed value of fodder and hay.

Corn cobs and straw are the least desirable roughages for fattening rations. They should be used only in limited amounts, unless roughages of higher quality are not available.

Silage may be used to advantage in cattle fattening rations during the early part of the feeding period. Corn silage, sorghum silage, and small-grain silages made when the grain is in the dough stage of maturity are classified as carbonaceous roughages. Silage replaces hay in the ration at the rate of 3 pounds of silage for 1 pound of hay. Too much silage in the ration during the period just before show or sale may cause wasty middles. During warm weather, silage spoils quickly and cannot be fed to 4-H calves unless a large number of other livestock are fed from the silo.

#### Proteinaceous Roughages:

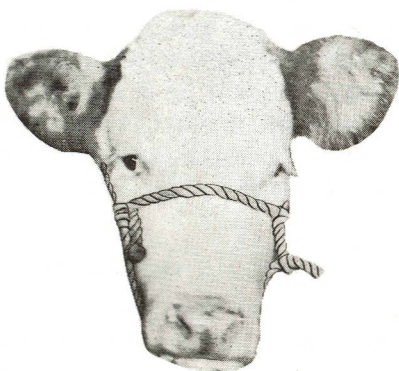
Most desirable of the legume hays are alfalfa and red clover. Not only do they supply protein, but the current year's crop, if properly harvested, is fairly high in carotene. In addition, alfalfa contains unknown factors that seem to aid in livestock nutrition.

If alfalfa hay is the only roughage fed, it should be medium quality, green, and leafy. The best alfalfa hay available should be provided if it is fed with some low quality roughage. Since red-clover hay contains less protein than alfalfa hay, a slightly larger amount of protein supplement will be needed to balance a ration with clover hay.

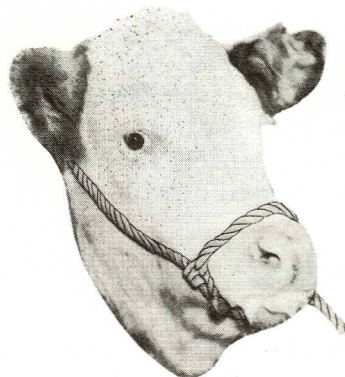
Bloating on legume hay is not uncommon, yet many feeders use large amounts for fattening cattle without serious trouble with bloat. Cautious cattle feeders often feed so little roughage that many cases of bloat probably occur as a result of too little bulk in the ration. Grinding the hay and mixing it with concentrates helps to prevent bloat.

Grass, legume, beet-top, and beet-leaf silage are fairly high in protein, but low in carbohydrates and fats. Like the carbonaceous silages, only a small amount should be fed immediately prior to show or slaughter.

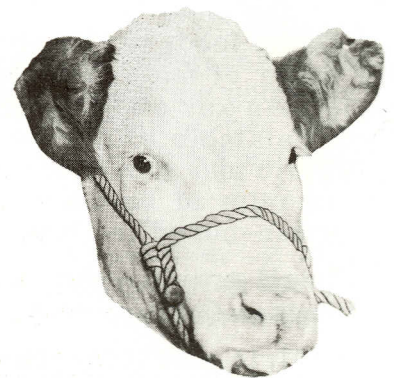
Green growing pasture is very high in protein. Because calves that graze for a large part of the day often do not eat enough grain, pasture should be used sparingly for show calves. Calves permitted to graze for a short period each day usually get needed exercise, and are provided with nutrients that may be lacking in the dry-lot ration.



Halter is too high.



Halter is too low.



Halter is just right.



## STARTING AND FEEDING THE CALF

Concentrate feeding should not be started until after the calves (1) become accustomed to their new surroundings, (2) are drinking water regularly, and (3) have filled well on grass hay or pasture. Grass hay or pasture is the most desirable feed for the first few days following shipping. Watch the calves closely for sickness that may develop. Often calves have colds which cause a mucous discharge from the nostrils. Feeding the hay on the ground or furnishing pasture these first few days will help remove the mucus from the air passages.

Eating grain is a new experience to most weanling calves. First they must learn what it is. A bulky starting ration is best. A pound of oats or wheat bran placed on top of the hay for a few days helps to get calves acquainted with concentrates. As soon as they learn to eat the oats or bran, start feeding the concentrate and hay in separate bunks. Gradually increase oats, bran, or both for several days. If all is well at the end of a week or 10 days, calves should then be changed slowly to the fattening ration. At the end of the third week they should be getting all the grain they will clean up in about 30 minutes. After that, slowly increase the amount of concentrate to what they will clean up in about an hour.

While the calves are getting on full feed, they should have all the hay they want. At the end of three weeks or a month they still may be eating more hay than grain. As the feeding period progresses, the appetite for grain should gradually increase. By the time they weigh 700 to 800 pounds they should be eating about 1.6 to 1.8 pounds of concentrates and only 0.6 to 1 pound of hay per hundred pounds live weight, daily.

Be careful not to overfeed in the early part of the feeding period. This often causes founder. A foundered calf seldom makes profitable gains. Where a number of calves are fed together, all should be driven to the trough at each feeding. One calf refusing to eat may allow another to overeat and get "off feed" or founder.

Calves often get "off feed" and refuse to clean the bunk. In some cases, they refuse to eat grain at all. In either instance, determine and remove the cause. Then get the calves back on feed as quickly as possible. If the disturbances are mild, reduce slightly the amount of grain fed for two or three feedings. In more severe cases omit one feeding, then start with about half a feed of grain and return to a full feed within three or four days.

The following schedule may prove helpful for getting the calf on full feed.

1. Feed 1 pound of oats or bran daily until the calf is accustomed to concentrates.
2. Increase the concentrates fed daily by 1 pound every third or fourth day until about 30 minutes is required for the calf to clean up his feed. During this period the calf should be changed gradually from oats or bran to the concentrates used in the fattening ration.
3. Following this, increase the grain very slowly (1 pound each week or 10 days) until it takes the calf about one hour to clean up his grain ration.

## FATTENING RATIONS

In table 3, basic rations are given; they may be modified to include most available feeds. These rations make use of home-grown feeds, and have been proved satisfactory by cattle feeders and in beef cattle fattening experiments.

Any of the carbonaceous concentrates may be substituted for corn as indicated in the discussion of feeds available. Soybean and cottonseed meal may replace each other in the ration. When commercial protein concentrates containing less than 40 per cent protein are used, proportionately more supplement and less grain should be fed. For example, 2 pounds of 20 per cent supplement will usually take the place of 1 pound of 40



Table 3. Rations for fattening calves.

Weight of calf	Ration 1		Ration 2		Ration 3		Ration 4	
500 lbs.	Ground or shelled corn	8 1/2 lbs.	Ground or shelled corn	7 lbs.	Ground or shelled corn	8 lbs.	Ground corn and cob meal	10 lbs.
	40% protein supplement	1/2 lb.	40% protein supplement	2 lbs.	40% protein supplement	1 lb.	40% protein supplement	1 lb.
	Legume hay	5-6 lbs.	Prairie hay	5-6 lbs.	Alfalfa hay	2-3 lbs.	Alfalfa hay	3-4 lbs.
	Mineral*	free choice	Mineral *	free choice	Prairie hay Mineral *	2-3 lbs. free choice	Mineral *	free choice
900 lbs.	Ground corn	17 1/2 lbs.	Ground corn	16 1/2 lbs.	Ground corn	17 lbs.	Use any of the three rations given to the left. Do not feed cob meal during the late fattening phase.	
	40% protein supplement	1/2 lb.	40% protein supplement	1 1/2 lb.	40% protein supplement	1 lb.		
	Legume hay	4-6 lbs.	Prairie hay	4-6 lbs.	Alfalfa hay	2 or 3 lbs.		
	Mineral *	free choice	Mineral *	free choice	Prairie hay Mineral *	2 or 3 lbs. free choice		

\* Steamed bonemeal or dicalcium phosphate mixed with loose salt, equal parts by weight.



per cent protein supplement and 1 pound of corn. Grass hays may be substituted for prairie hay. Red clover can be substituted for alfalfa, if the protein supplement is increased slightly.

The rations in table 3 are given in the approximate amounts needed by the 500- and 900-pound calf. They can be changed to meet the needs of the 400-pound, 600-pound, 700-pound, 800-pound, or heavier calf by changing the grain portion of the ration to about 1.6 to 2 pounds daily per hundred pounds live weight.

## The Business of Cattle Feeding

### FACTORS AFFECTING PROFIT

Three factors determine the profit you make while feeding cattle. They are (1) the price paid for the calves, (2) the cost of gains, and (3) the price received for the finished cattle. In discussing these factors, the terms price margin and economical gains are often used.

Price margin is the difference between the price paid for the feeder per pound and the price received for the animal per pound when sold. For example, if you paid 20 cents a pound for your calf and later sold him for 21 1/2 cents, the price margin is 1 1/2 cents.

Economical gains are realized by an efficient feeding program. It is done by putting 100 pounds of gain on your calf for less than you receive for the 100 pounds of beef when sold. If an economical ration is fed to a calf that gains well, the cost per pound of gain should be low.

The size of the feeder cattle and the length of the feeding period largely determine whether price margin or economical gain is the more important. When calves or light yearlings are fed for a long period, most of the profit is obtained through efficient feeding (economical gains). Calves and light yearlings are usually more efficient in their utilization of feed; that is, they gain more per 100 pounds of feed than heavier cattle.

If you feed heavy cattle, you will need to depend more on price margins. The price margin must be great enough in the cattle feeders favor to insure a profit; because the cost of putting 100 pounds of weight on heavy cattle is much higher than for light cattle, and the length of the feeding period is usually short.

### HOW AND WHERE TO SELL



There are two common methods of marketing finished cattle. Organized market channels, such as those in Omaha, Sioux City, and local sale barns, receive slightly over half the finished project calves. They also receive most finished cattle from other sources. Some counties hold a marketing day at livestock markets. On marketing day the club members ship their calves to a market center; and go as a group to watch the selling process and to learn more about marketing and processing of beef.

The next largest market for 4-H calves has been the auction sale of club calves. These sales are usually connected with a fat calf show. Competing in the show may be a requirement to sell through the sale.

A few calves are consumed at home. These calves are slaughtered and placed in a local food locker or freezer.

Many 4-H members tour packing plants each year. Courtesy of Swift and Company.



## WHEN TO SELL

The ideal time to sell is when the price for the particular grade of beef that you have produced is at a seasonal high. Generally speaking, cattle grading "good" sell highest during late spring and early summer; cattle of "utility" grade reach their seasonal peak slightly earlier; and both "choice" and "prime" grades usually reach a high during the fall. Selling price of "choice" cattle tends to decline during the winter months; while prices for "prime" grades tend to remain steady until after the holiday season.

## Health of Cattle

Healthy cattle are an absolute necessity for rapid and economical gains. Knowledge of the methods of prevention and control of the common cattle diseases and parasites is essential in successful beef production. However, when sickness does occur a veterinarian should be consulted.

### PHYSIOLOGY OF CATTLE

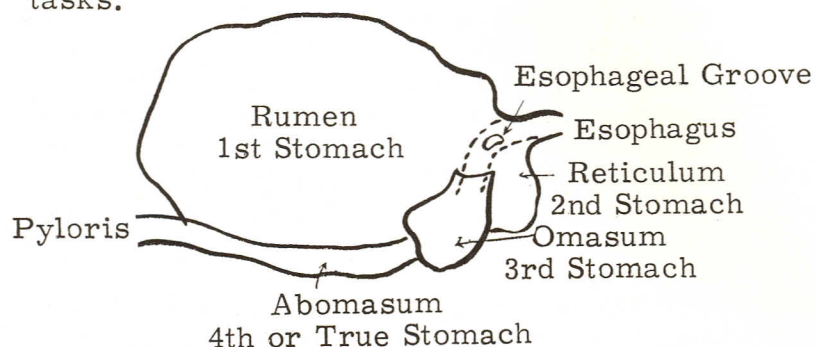
An understanding of the characteristics of the healthy calf is necessary before you can recognize a sick one. Any change from the normal may be a sign of some ailment.

The body temperature of the beef cow is normally  $101^{\circ}$  Fahrenheit, but may vary from  $98^{\circ}$  to  $102^{\circ}$ .

The rate or ease of breathing is affected by many diseases, particularly those involving the lungs. A normal, healthy animal will breathe between 10 and 30 times per minute. During hot weather breathing may be faster; and when very hot the animal may pant. When diseases such as pneumonia occur the breathing becomes more rapid and each breath is short.

The heart beats from 60 to 70 times a minute. The rate will change if the animal is excited, the weather is hot, or the calf is sick. The heart beat may be heard by pressing your ear against the ribs just behind the left elbow of your calf. It makes a noise something like lubb-dubb.

The digestive system of a calf is not the same as that of many other animals. The main differences are in the teeth and stomach. Cattle, sheep, and goats have no upper front teeth and have four stomachs; while animals such as horses and hogs have upper front teeth and only one stomach. The four stomachs are named as follows: rumen (paunch), reticulum (honey comb), omasum (manyplies), and abomasum (true stomach). When a calf is born only the true stomach is ready to function. As the calf grows and begins to eat roughage the other three stomachs enlarge and begin to do their specific tasks.



Parts of a cow's stomach.

The rumen is the largest of the four stomachs and in an adult animal may hold as much as 50 gallons. It is located on the left side of the body and is constantly moving. This movement can be felt by placing your fist in the left flank area just ahead of the hip bone. Press gently and allow the movement of the rumen to push your hand up. In healthy cattle, rumen movements will occur two to three times a minute. These movements mix the feed and aid in forcing the feed to the mouth to be re-chewed.

When cattle eat roughage, they form it into a ball called a bolus. Saliva from the mouth is mixed with the bolus. The saliva aids the digestion of the food and helps the



calf swallow the bolus. The boluses are stored in the rumen until the animal has an opportunity to rest and chew its cud. During the process of ruminating, coarse feed is returned to the mouth and chewed into smaller pieces and re-swallowed. It takes about three to four seconds to chew a bolus; and three to four seconds before the animal starts to chew another bolus. The time spent by contented cattle for ruminating varies with the ration, but will be between 7 and 10 hours each day.

After the food has been re-chewed, it enters the reticulum or second stomach. The reticulum is the stomach where bits of wire or nails often accumulate. The omasum then receives the food. It helps remove the juices from the feed and may help grind the feed into smaller particles. In the abomasum, or true stomach, additional juices are mixed with the food and the final steps in digestion begin.

## DIGESTIVE TROUBLES

Digestive troubles are caused mostly by poor management. Anything you do to insure good feed management will aid in the prevention of these ailments. Some of the common digestive troubles of fattening cattle are:

Bloat. Digestion of some feeds in the rumen may produce considerable gas. The ruminant usually belches most of this gas, but occasionally the gas forms too rapidly and the cow or calf can not get rid of it. The rumen becomes tight and presses upward on the left side. Breathing then becomes difficult.

You may help the animal to belch by standing its front feet a foot or more higher than the back feet. If the calf continues to bloat, call a veterinarian. Should it be impossible to get one in time, an experienced cattleman may be able to help you.

A change of feed will generally avoid a recurrence of the trouble, unless the animal is a chronic bloater. Chronic bloaters are not likely to gain rapidly and probably should be sent to market.

Founder is usually caused by eating too much concentrate. In severe cases the feet become sore and the calf is unwilling to walk. Unless recovery is very prompt the tenderfootedness may continue; and by the end of the feeding period the toes will have grown out and will have turned up. While the calf may finish profitably, its desirability for show is decidedly reduced.

Hardware disease is a common term used to indicate that a calf or cow has swallowed some metal, and that the metal has lodged in the digestive tract. Sometimes a nail or piece of wire may pierce the stomach wall and go into the lungs or heart. After this occurs the only remedy is for a veterinarian to operate and remove the object. Because animals recover slowly from this kind of operation, it is probably best to market animals rather than to operate.

Good management can help prevent hardware disease. Keep nails, wire, and other metal objects out of the feed, feed bunks, and feedlots. You should examine the bunk or manger frequently for nails that might have worked loose.

Impaction of the digestive tract may occur occasionally when dry, coarse feed of poor quality is fed. Plenty of water to drink, a balanced ration including green leafy hay with a proper supply of protein, and mineral will aid in preventing impaction.

Scours or diarrhea is a too rapid discharge of the contents of the bowels. The discharges are usually watery and may have a bad odor. Diarrhea occurs with many infectious diseases. If your calf appears to have a high temperature, you should call a veterinarian. If the temperature is about normal, the diarrhea may be due to faulty feeding, improper handling, or a heavy internal parasite infestation. You should determine and correct the cause.



## INFECTIOUS DISEASES

Infectious diseases of cattle are caused by the growth of harmful bacteria or viruses in the animal's body. Permitting animals to live in dirty lots and shelters promotes disease. Lots deep in manure, water tanks catching manure or urine of animals, or ponds that receive run-off water from lots contribute to the spread of disease from one animal to another. Good management (sanitation) is the best way to prevent spread of disease. Listed here are some of the more common infectious diseases of cattle.

Blackleg is a disease of young cattle; and is usually fatal. It is best to prevent blackleg by vaccination, during the first few months of the calf's life. Cattle over two years of age seldom have blackleg.

Brucellosis is also known as Bang's disease or contagious abortion. This disease may cause a cow to have premature calves. Spread of the disease may occur through the feed and water, or by direct contact with the aborted calf and afterbirth. Man may contract this disease by handling infected material or by drinking milk which contains the bacteria. In man the disease is called undulant fever.

Good sanitation and careful management are essential; especially at calving time. You can control brucellosis by vaccinating the young females when they are between four and eight months of age.

Footrot most frequently occurs when cattle are compelled to stand and walk in poorly drained, unsanitary lots. The first noticeable symptom is usually lameness. An examination of the foot may disclose little more than a redness in the skin between the toes or the pastern. In this stage the condition may usually be stopped by thoroughly cleaning the sore part with soap and water, and painting the area with tincture of iodine. The animal should be kept in clean dry quarters until well.

If your calf's lameness continues or if pus is present, you should consult a veterinarian.

Pink-eye is most common in late summer and fall. The eyes water and in severe cases become cloudy. If this condition is allowed to continue, it may result in blindness. Put the affected animal in a dark stall away from flies. Wash his eyes with boric acid solution to clean the eyelids. If improvement is not noticed in one or two days, consult your veterinarian for more specific treatment.

Ringworm is caused by a fungus which grows in the skin. The skin becomes rough and the hair will drop off in circular spots. It may be helpful to scrub the area and then paint it with iodine. Do not use a comb or brush on an animal with ringworm that is to be used on another animal. Be careful in handling a calf with ringworm; it is possible for you to become infected.

Ringworm in calves is usually worse in late winter and spring when calves have been kept in close, crowded quarters. The disease usually disappears during the summer months.

Shipping fever is associated with the moving and the disturbance of cattle. Anything that lowers the resistance of the animal may help start the disease. Such things as chilling or overheating, crowding, over-tiring, and irregular and improper feeding may start the disease.

Common symptoms include high temperature, loss of appetite, rapid and labored breathing, gaunt appearance, coughing, and sometimes diarrhea. The disease may develop rapidly and result in sudden death, or pneumonia may develop. Consult your veterinarian for diagnosis and treatment. Sensible management and a balanced ration will do much to prevent this disease.

Warts are quite common on calves and yearlings. They are caused by a virus. Serious cases are unsightly and painful, but not fatal. The warts usually disappear with time (two to three months) without treatment.



## INSECTS AND EXTERNAL PARASITES

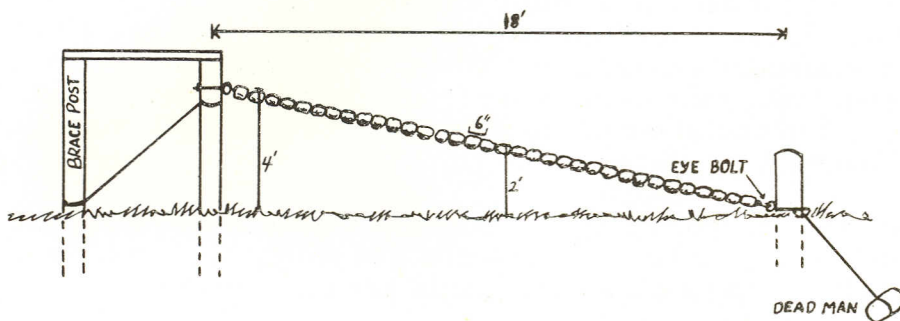
Numerous pests annoy beef cattle. Some are serious enough to reduce gains and sales value. The more common pests of beef animals in Nebraska and control measures are:

Cattle grubs. The adult fly lays eggs on the hairs of the legs and undersides of animals. Upon hatching, the larvae (grubs) migrate through the tissues of the animal. By late winter or early spring, the grubs have migrated to the backs of cattle. Control consists of applications of rotenone after the grubs have made openings in the animal's back. Either a dust or a wash may be used.

If you use a dust, apply at the rate of about 3 ounces per animal. Ruffle the hair vigorously during application so that the powder goes down to the skin. A duster can be made by punching holes in the lid of a quart jar. A suggested dust is made by combining one part of a 5 per cent rotenone dust with two parts dusting sulfur.

If you use a wash, apply 1 to 2 pints per animal. Work the wash into the hair with a stiff scrub brush. An effective wash is 1/2 pound of a 5 per cent rotenone dust, 5 gallons of water, and one small handful of a household detergent.

Make the first application of a dust or wash 21 days after the first grub "bumps" are noticed in the back. This is usually in the middle or latter part of January. Make the second application 30 days later; and the third, 30 days after the second.



Now to construct a back-rubber: A cable, chain or several strands of barbed wire is stretched between the posts, and wrapped with burlap sacks. The sacks are tied every 6 or 8 inches. Apply solution to the sacks when needed.

mix 1 level tablespoon of a 5 per cent rotenone dust per gallon of water. Thoroughly cover the body and legs of each calf. Fall applications are important to kill lice before they build up large numbers. Start treatment the latter part of October or early November. Repeat in two or three weeks, if necessary.

Horn flies. Horn flies are small blood sucking flies that gather on the backs of animals in spring and summer. They can be controlled with a 5 per cent methoxychlor dust. Apply a small handful to each animal; rubbing it lightly into the hair along the back and shoulders.

If you have several calves in a lot, you can use a back rubber. A spray may also be made by mixing 8 level tablespoons of a 50 per cent wettable methoxychlor powder per gallon of water.

Stable flies. Stable flies, sometimes called biting houseflies, are about the size of houseflies, and resemble them very closely. The stable fly sucks large amounts of blood, irritates calves, and is difficult to control. The best control methods are to maintain good sanitation by removing manure and decaying straw at least once and preferably twice each week. This will prevent breeding of stable flies.

Cattle Lice. Two kinds of cattle lice may infest cattle. The large blue lice that suck blood from the animals; and the small red lice that chew hairs and skin and cause severe irritation. Both may be controlled with a 5 per cent methoxychlor dust or a 1.5 per cent rotenone dust.

If a spray is used, mix 8 level tablespoons of a 50 per cent methoxychlor wettable powder per gallon of water; or



Sprays containing pyrethrum (such as pyrenone or pyrexcel) or an allethrin spray are the most satisfactory. You should apply the spray at least every two days when flies are numerous. Never put large amounts of oil sprays on animals. Follow the directions on the container.

House flies. House flies do not bite animals, but annoy them. They may be controlled with sprays in barns by using the same materials listed for stable flies. They may also be controlled with poison baits of malathion or dipterex. If baits are used, use solid type baits or sugar baits. When using poison baits, be certain to follow the directions on the package. Poison baits will not control stable or horn flies. Destruction of breeding places, as in the control of stable flies, is important.

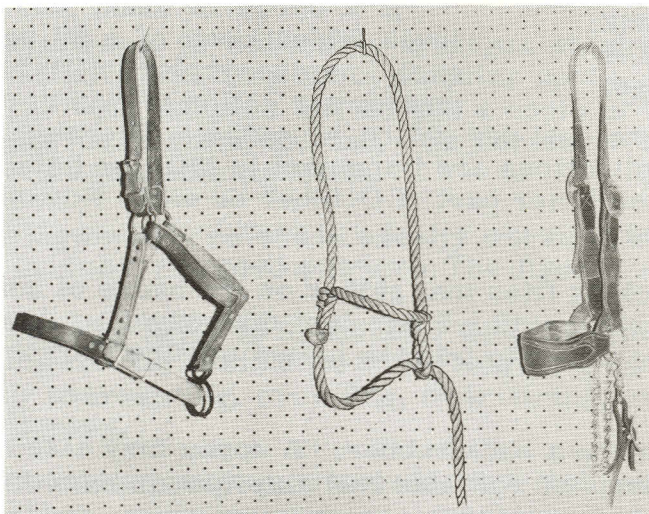
Screwworms. Screwworms feed in fresh wounds. Adult flies lay large numbers of eggs on the edge of fresh wounds. The maggots, upon hatching, feed on the flesh and may kill animals if they are not controlled. Treat all wounds with smear 335 or smear 62. Apply the smear with a paint brush. Do not brand, dehorn, or otherwise break the animal's skin during fly season.

## POISONS

Chemical poisons. Present day methods of farming require the use of many materials that are poisonous if swallowed. Care must be exercised to keep such materials away from livestock. Anything that may be poisonous should be stored where it can not be accidentally mixed with or mistaken for feed; and empty containers should be disposed of where cattle can not lick them. These materials include fertilizers, tree and plant sprays, rat and rodent poisons, disinfectants of different kinds, weed sprays, and paints (if they contain lead). Also, you should keep your cattle away from freshly painted places. If accidental poisoning does occur, the container of the poisonous material will usually give directions for emergency treatment.

Plant poisoning. Care must be taken in feeding drouth stricken plants of the sorghum family and poorly cured sweetclover hay. Also, some seeds and plants are poisonous during certain stages of their growth. Young cocklebur plants are an example.

## Halters



Different kinds of halters are used. For example; the common horse halter (left) is used for tying calves to the stall, an adjustable rope halter (middle) may be used to train calves to lead, and a show halter (right) is used for leading calves.

Two types of halters are generally used for tying and leading animals. All halters consist of a head stall or head piece, a nose piece, and a lead.

### PARTS OF A HALTER

The head stall is the rope or strap that is placed over the head back of the ears. It should be adjustable to permit use on different sizes of calves.

The nose piece is the part fitting across the calf's nose. The proper location is half way between the eye and the nostril of the calf. Nose pieces that are too near the calf's muzzle may choke him.

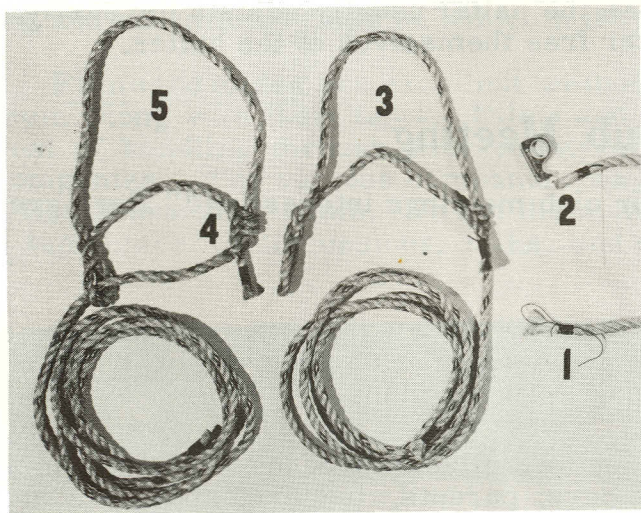
The lead should be attached to the nose piece and head stall on the right side of the calf's head. It is then carried under the jaw to the left side. If the halter is to be used for tying only, the lead will be attached to



the nose piece and head stall on the left side. If the halter is to be used for leading, the lead will go through a ring or loop on the left side where the head stall and nose piece join. Such a halter permits the lead to be drawn tight under the jaw when response of the animal is desired. Halters used only for leading may have 16 to 18 inches of link chain on the end of the lead going under the jaw.

## STEPS IN MAKING A ROPE HALTER

A good general purpose halter may be made of rope. Because calves grow rapidly such halters should be adjustable. Manila rope is preferred because manila hemp is stronger, softer and more pliable than sisal hemp. Rope of various diameters may be used for cattle of different ages, but a halter of 12 feet of 5/8-inch rope is most desirable. The ends of the rope should be small enough to pass easily through the tie rings. Whipping the ends of ropes usually ensures small, compact ends. A temporary whip may be made by putting scotch tape on the ends of the rope.



1. Strong cord is used for whipping the ends of a rope.
2. After the ends are whipped, scotch tape placed around the ends will make the rope easier to work between the strands.
3. The head stall is formed.
5. The completed halter. Notice how the short end is tucked between the strands of the rope at 4 to prevent slipping. The halter is placed on the animal so that the loop is at the left side of the jaw.

A marline-spike is used to make separation of strands easier. It is a round piece of iron or wood with one end pointed. The other end serves as a handle. The pointed end may be flattened somewhat. After pushing it between two strands of rope, the strands are easily spread by a 1/4-roll of the marline-spike.

The loop. Take the rope in the left hand. Allow 22 or 23 inches to extend to the right, between the hand and the short end.

Grasp the rope between the thumb and forefinger at this point; and with the marline-spike, open the rope by lifting two strands.

Bring the short end around, clockwise (to the right), and put it through the opening in the rope. This forms a loop.

Close this loop until the inside diameter is about twice the thickness of the rope. A loop that is too small will close too tightly when the halter becomes wet and shrinks.

Next grasp the loop with the right hand. With the marline-spike, open the short end of the rope outside but next to the loop. Lift one strand.

Take the long end of the rope, bring it from the left and push it through the opening made in the short end. This completes the loop with an equal number of strands on each side of the splice. This procedure leaves the inside of the splice very smooth where it rubs against the calf's jaw.

The nose piece. The short end of the rope becomes the nose piece of the halter. Measure off 11 inches of it from the loop.



With the hands 2 or 3 inches apart, one at each side of this point, grasp the rope firmly with one hand and untwist it with the other.

Then close the distance between the hands slightly, keeping the rope untwisted. This allows each strand to form a separate loop. These loops may be opened further and brought into line by working the marline-spike through all three strands at once.

Take the long end of the rope and tuck it through all three loops, starting with the inside loop. Draw it through until the loop formed becomes the right size for the head stall or head piece of the halter.

By putting the long end through the loop at the other end of the nose piece, the halter is completed. This halter may be readily and safely adjusted.

Note: The so-called double loop halter that has a loop at each end of the nose piece is objectionable for use in tying. This is because the halter usually adjusts too easily. Many calves that are tied with a double loop halter free themselves of the halter.

## Suggestions for Club Meeting

Many clubs ask, "What can we do to make our club meetings interesting?" Here are some suggestions.

### PLANNING A CLUB PROGRAM

The secret of a successful club meeting and a successful club program is (1) planning, well in advance, and then (2) following through with the plan.

To help the club with its program, a yearbook is available through the local county extension service office. A committee of members, parents, leaders, and other interested people should make plans for both the club year and the immediate club meeting. They should also be responsible for carrying out the plan. The most successful program will involve everyone who is concerned, in one manner or another.

When plans for a club meeting are being made, the committee should keep in mind the three major parts of most club meetings. They are:

The business meeting. Problems concerning the welfare of the club are discussed at this time. They may involve the time and place of future meetings, suggestions for future meetings, the need to change plans which have previously been made, and plans for participation in various 4-H and community activities.

The educational session. This is an important part of the club meeting, because members and their parents may study problems pertaining to the project. The educational meeting can be conducted in various ways. Some of the possibilities will be discussed later.

Recreation. Recreation is a must with all programs. It gives members, leaders, parents, and visitors an opportunity to relax and become acquainted. The recreational phase of a meeting may vary from an informal "gab-fest" with something to eat, to a highly organized and pre-planned program of games and folk dances.

A distinct line need not always be drawn between the parts of a meeting. Many programs blend the educational and recreational phases of the program into one. Also, many clubs have special meetings that emphasize only one or two of the major parts of a club meeting; for example, a party.



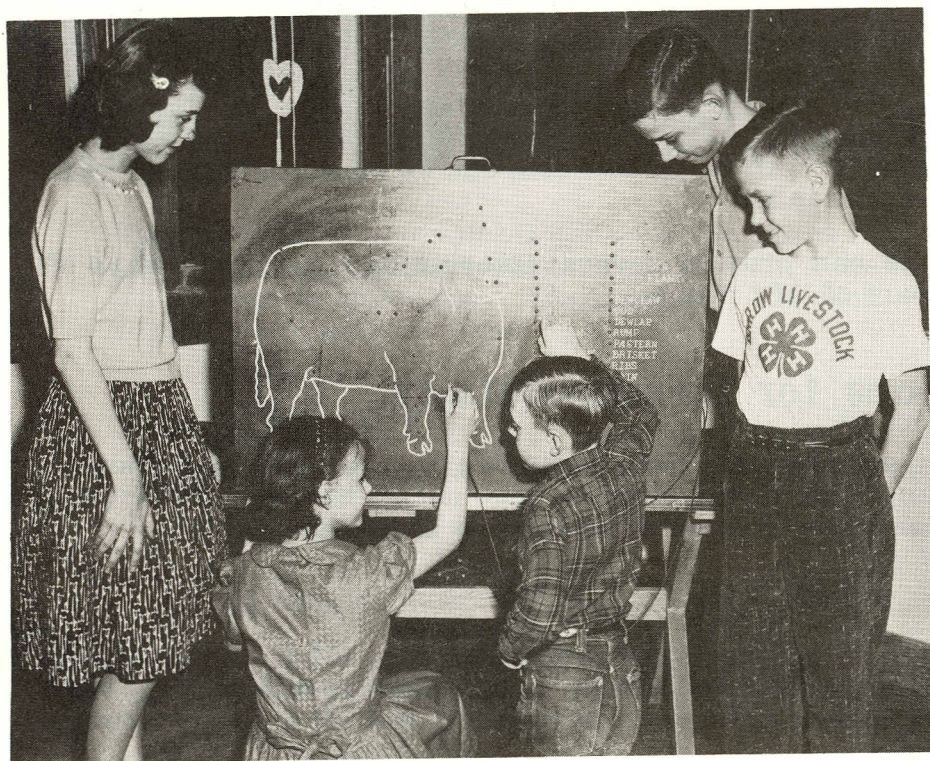
## EDUCATIONAL PROGRAMS

An interesting educational session can be conducted in many ways. Discussions, talks, films and slides, judging and identification, demonstrations, and field trips and tours can be used in the program. Your club program may include some other educational feature. For any program, use variety. Do not conduct every meeting in the same way.

Discussions can be educational as well as fun. Discussions work best with small groups. Where a large number of people are willing to take part, they should be separated into small groups and asked to discuss a common topic. Another way of handling large groups is to have a few discuss a topic while the rest listen. After the discussion the listeners may wish to ask questions. This type of program is known as a panel. Any topic can be discussed.

Talks are often used. Club leaders, members, parents, and guests can give interesting and educational talks on subjects they know and understand.

Films and slides are excellent methods of teaching, and quite often speakers will use them along with their talks. Films and slides can be obtained free of charge or for the cost of handling through your county agent, local businessmen, and various business companies. The various companies may be contacted by writing to them and asking for a list of available films. To get the most from films and slides, they should be used as a supplement to discussions, talks, and demonstrations.



Many 4-H clubs are using buzz-boards to learn the parts of an animal. Courtesy of the Arrow Livestock 4-H Club of Custer County.

Judging and identification is a requirement of the 4-H club program, and can make for a very interesting meeting. Besides the judging of live animals, the group may judge carcasses and packaged meat products as the housewife buys them. A meeting may be devoted to the identification of parts of an animal, parts of the carcass, or cuts of meat. Identification of various types of feeds and their uses, or the judging of rations for a specific calf, are also fun and educational.

Demonstrations can be given on many topics related to the production and marketing of beef. They may be given by either a 4-H club member or a guest speaker. Every club member should be offered an opportunity to give a demonstration during the project year. Ideas for demonstrations may be found throughout this circular.

Tours and field trips are an excellent way of getting members to see the feeding and management programs of various club members. Visits to packing houses, livestock marketing centers, feed mills, and feed lots are also profitable.



## WAYS TO USE SUGGESTIONS

Your next question may be, "Now that I know what to do, how do I do it?"

To begin with, one of the purposes of this circular is to help you with the educational part of your club meetings. This circular discusses the various phases of feeding and caring for market cattle. Each topic discussed can be used for your club meeting. One important thing to remember is never to try to solve all the problems at one meeting. It can not be done. Some suggestions for meetings are as follows:

One part of the manual discusses "Selecting the Feeder." A meeting on this topic has many possibilities. Someone might give a talk on "How to Select a feeder," and a club member or two might show the parts of a calf. A film on how to judge cattle can be obtained for the asking from the Aberdeen Angus Association. Actual experience is the best teacher. If possible, have a class of calves available for judging. A class can consist of two or more animals.

The part of this manual that pertains to feeding contains basic material for developing a number of topics. For example; minerals is one topic that might be developed into an interesting program. The meeting might start with a demonstration by one or two club members on "Mineral Mixtures for Fattening Cattle." This could be followed by a talk or discussion on minerals.

Now let us look at the place of roughage in the feeding program. The meeting could start with the members identifying or judging various samples of roughages. Identification sessions are an excellent way of creating discussion, because as people look over samples they begin to discuss them. Take advantage of the situation and have a discussion session on the topic.

Let us look at the subject "Brucellosis." Most local veterinarians will be glad to meet with you and discuss the topic. A film on brucellosis can be obtained through your county agent's office to supplement the talk.

Proper use of project records can provide several interesting meetings. Ways of using them are given in the last part of this manual.

## Suggestions for Demonstrations

It is the goal of your county agent and your club leader to give every 4-H member an opportunity to give a demonstration. Your demonstration need not be long or complicated. In fact, the short, simple demonstration is often superior to a long one.

### PARTS OF A DEMONSTRATION

When you are asked to give a demonstration, remember that (1) a demonstration should show how to do something as well as tell about it, (2) some people will try what you have shown, so be sure that what you say and do is correct, and (3) a demonstration consists of three parts as follows:

The introduction consists of introducing yourself, your teammate if you have one, and your topic. Introducing your topic is of greatest importance, because this is the time to get the interest of your audience and to create a desire to know more about the topic. When introducing the topic, tell the audience what they are going to see and hear, and explain why you selected the subject and its importance.

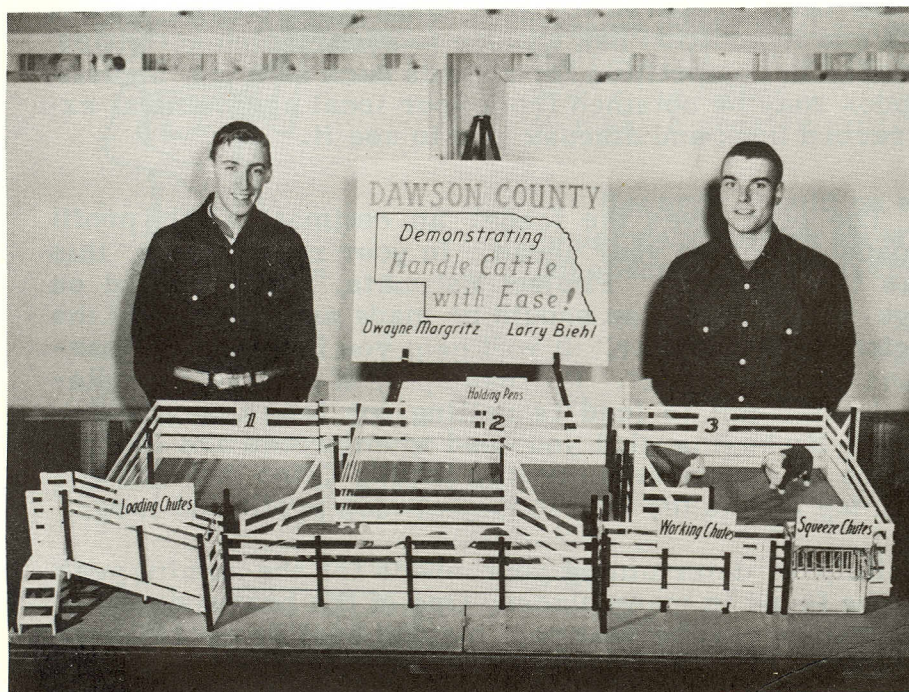
The body consists of the main part of the demonstration. At this time you will show the audience how to do something; and you will explain to them each step and why you did it as you did.



The summary consists of a review of what you have shown. You should touch on the highlights of the body; and you should remind your audience of the value of applying the practices they have just seen.

At the end of the demonstration, ask the audience for questions. This gives them a chance to learn more about your subject.

## SUGGESTED DEMONSTRATIONS



The subject of the demonstration should be one that you already know and understand, or it should be one on which you are willing to study a great deal. Some suggestions and examples are listed below.

There are many other possible demonstrations. Contact your club leader, your county agent, and various businessmen and business firms for help with your demonstrations. They will be glad to give you suggestions, references, material, and help. Many leaflets and guides on how to give a demonstration are available through your county extension service. Two of them are E. C. 0-05-2, "4-H Demonstrations", and E. C. 0-08-2, "Score Card for Team Demonstrations."

Opportunities are available for club members to give demonstrations at club meetings before the public and in contests. Courtesy of Dawson County Extension Service.

### GENERAL TOPIC

Judging cattle

Care and management of cattle

Equipment

Feed

Diseases and parasites

Livestock conservation  
(How to reduce the loss of meat)

Marketing

### SPECIFIC EXAMPLES

Procedure in judging cattle

Dehorning methods  
How to trim feet

Arrangement of a feed lot  
Construction of a feed bunk

Opening a feed bag  
How to store and care for the calf's feed

Fly control

Proper sanitation and hygiene practices

Proper shipping practices  
Grub control

How to prepare for shows and sales  
How to wrap meat for the freezer



## Records and How to Use Them

Records are an important part of any business. They may determine whether or not a business is profitable. A good set of records consists of three parts:

- (1) A plan of business.
- (2) A record of events as they happen.
- (3) A summary of the business activities.

All of these are needed, if you are to derive the greatest benefits from your records. A standard project record book has been prepared for your use. This record book is divided into the three listed parts and in addition has a place to record club activities. Information in the last section is needed in competition for awards such as trips, medals, and scholarships. This record book may be obtained from your local agricultural extension agents. Let's look at the record book and discuss how to use it.



The plan gives the feeder an estimate of the profit prospects for the year ahead. In your record book, this plan is called the "Project Estimate," and is found on page two. This plan should be made and filled in at the beginning of the year. It will help you to recognize bargains on the market. For example, if a protein supplement you want to feed is selling for less than usual — buy it. By buying what you need when prices are low you will be able to make a greater profit. Often this advance planning means the difference between profit and loss.

Help in determining your needs for the coming year may be found in many places. One of the best sources of information may be your past market beef project feeding records. This manual will also give you some idea as to your needs for a year; and experienced feeders will be glad to help you.

For an estimate of the possible income, the best sources of information on future prices are farm announcers on radio and TV, farm magazines, bankers, and your county agent. They can give you information as to market trends.

The first or second club meeting of the project year might be devoted to filling in the "Project Estimate." Some club members make a game of planning; the idea being to see how close the plan and the summary agree.

A record is necessary to summarize the project. This record should tell the story of how the project animal was cared for and fed during the year. Do not rely on your memory. Past events are quickly forgotten without some form of written record.

To aid you with your record book, it is suggested that a barn record be kept. A barn record form is available at your County Extension Service. It should be tacked to the wall near the place where the feed is stored. As feed is obtained, a record can be quickly made on the sheet, and then copied into the permanent record at your convenience. The permanent record should be brought up to date at least once a month. All purchases and expenses should be recorded.

During the year, you should compare your feeding program with others. If you can obtain the desired results with a cheaper ration, then change to it. Such a practice will help increase the chances for making a profit. Other members of your club and their parents and friends will be glad to help you study various feeding programs and rations. You should compare and evaluate feeding programs at one or more club meetings during the year.



THIS CERTIFICATE OF ACHIEVEMENT  
WAS GIVEN ME WHEN I COMPLETED MY  
BEEF PROJECT.



The summary should show whether or not a profit has been made. If the project lost money, the record should show the reason. When the project makes money, the record may aid in learning how to make more profit during the coming year. The summary should be used as a guide for planning future projects.

At the close of the project year, members and their parents might hold a meeting for the purpose of evaluating the records. Other people may see ways to make a profit where the owner did not; or they may be able to show how to make a greater profit.

Records should be accurate, complete, readable, and understandable for all who might read them. If they do not meet these requirements, they will have little value.



An air view of the Omaha Stock Yards

